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(54) COMPOSITION, USE OF A CELLULOSE ETHER AS THICKENING AGENT AND PRODUCTION OF A COATED CELLULOSE-BASED TWO-DIMENSIONAL PRODUCT

ZUSAMMENSETZUNG, VERWENDUNG EINES CELLULOSEETHERS ALS VERDICKUNGSMITTEL UND HERSTELLUNG VON BESCHICHTETEM ZWEIDIMENSIONALEM CELLULOSEPRODUKT

COMPOSITION, UTILISATION D'ETHER DE CELLULOSE COMME AGENT EPAISSISSANT ET FABRICATION D'UN PRODUIT BIDIMENSIONNEL ENDUIT A BASE DE CELLULOSE

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Description

[0001] The present invention relates to an aqueous, binder-containing composition for the coating, such as surface sizing or application of a layer of a coating slip, of cellulose-based two-dimensional products. The invention also relates to the use of a water-soluble nonionic alkylhydroxyalkyl cellulose as thickening agent and to a method for producing said coated cellulose-based products. The composition has improved properties at increased temperatures and at high shear rates. These properties are achieved by using as thickening agent a cellulose ether, which is substituted with hydroxyalkyl groups, such as hydroxyethyl and hydroxypropyl, and alkyl groups having 1-3 carbon atoms.

[0002] In coating, such as application of a layer of a coating slip or surface sizing of cellulose-based two-dimensional products, such as paper or cardboard, with a composition, the primary object is to change the properties of the paper product, such as improved strength, improved appearance, improved printability, improved impermeability or improved adhesion properties. Thus, it is common to surface-size paper or cardboard with an aqueous binder-containing composition for improving, inter alia, the wet strength, or to coat paper or cardboard with a composition, which contains pigment pastes, for improving the printability and the appearance of the surface. The coating slip compositions can, in addition to binder and pigments, also contain secondary binders (co-binders), protective colloids, thickening agents and dispersing agents. As thickening agent, protective colloid or secondary binder it is common to add water-soluble or water-swellable polymers based on polyvinyl alcohol, modified celluloses, starch, casein, alginate or high-molecular carboxyl-group-containing polymerisates.

[0003] The use of cellulose ethers in coating slips is disclosed in e.g. EP-A-0 015 517, where carboxymethyl cellulose is added as a secondary binder. From EP-A-0 307 795 it is known to use as protective colloid, inter alia, methyl cellulose. EP-A-0 425 997 discloses that hydrophobically modified alkylcellulose, alkylhydroxyalkyl cellulose or hydroxyalkylcellulose can be used as thickening agent in aqueous paper coating compositions. The hydrophobing groups are preferably C_{12-16}-alkyl groups or alkylaryl groups. When used in coating slip compositions, these cellulose ethers result in an improved viscosity at high shear rates, compared with carboxymethyl cellulose ethers. Even if paper coating slip compositions according to EP-A-0 425 997 result in paper coating slip compositions having properties that in some respects are better than those of carboxymethyl cellulose, they also have certain limitations. Thus, they give a comparatively low viscosity at the increased temperatures prevailing when drying the compositions.

[0004] From EP-A-0 496 269 it is also known to produce, for the coating of paper, a multipolysaccharide-containing suspension, which contains a low molecular polysaccharide, which is dissolved in the aqueous phase and which can be a carboxymethyl cellulose or a hydroxyethyl cellulose. Moreover, the coating composition contains one or more dispersed, i.e. not dissolved, cellulose polymers, such as hydroxypropyl cellulose, methyl cellulose, methylhydroxypropyl cellulose and hydrophobically modified hydroxyethyl cellulose. EP-A-0 651 093 describes a paper coating composition which contains a polysaccharide thickener and also a blocking agent that serves to prevent more than 25% by weight of the thickener from being absorbed onto a clay pigment surface. As suitable thickeners the publication mentions water soluble alkyl-hydroxyalkyl celluloses or hydroxyalkyl celluloses as well as their hydrophobically modified analogues, the hydrophobically modified analogous being the most effective. In the working examples a hydroxyethyl cellulose and a hydrophobically modified hydroxyethyl cellulose are used as thickeners.

[0005] Furthermore, US-A-3 931 069 discloses a ketene dimer dispersion containing a cationic dispersing agent and an alkyl hydroxyalkyl cellulose, such as ethyl hydroxyethyl cellulose, and the use thereof to size cellulose fibres.

[0006] According to the present invention as described in claim 5, it has now been found that an aqueous binder-containing composition for the coating, such as the application of a layer of a coating slip or a surface sizing of a cellulose-based two-dimensional product, such as paper and board, and where the composition has improved properties in respect of viscosities at increased temperatures and at high shear rates, can be obtained if a thickening agent of a water-soluble, nonionic alkylhydroxyalkyl cellulose is used, which contains alkyl groups having 1-3 carbon atoms and hydroxyalkyl groups containing 2-3 carbon atoms, but which is free from hydrophobically modifying hydrocarbon groups having at least 4 carbon atoms, the cellulose ether having a cloud point in the range from 35 to 80°C, preferably from 45 to 70°C. The alkylhydroxyalkyl cellulose thus is dissolved in the composition and its viscosity can vary within wide ranges, such as from 5 mPa·s to 150,000 mPa·s, but usually is 10-10,000 mPa·s in 2% aqueous solution at 20°C.

[0007] Compositions that are produced while using the above-described cellulose ethers as thickening agent have a low viscosity at high shear rates and a low tendency to splash, which makes them suitable to apply on two-dimensional cellulose products, such as paper and board. The viscosity increase which arises in the composition when the coated cellulose product is heated during the drying stage, stabilises and immobilises the applied layer and facilitates the subsequent treatment. Despite the increasing viscosity, the inventive compositions have as good dewatering or even more rapid dewatering than compositions containing other types of cellulose ethers and not having the same viscosity increase at an increased temperature.

[0008] Typical cellulose ethers for use in compositions according to the invention are ethylhydroxyethyl cellulose, methylethylhydroxyethyl cellulose, methylethylhydroxyethylhydroxypropyl cellulose and methylhydroxypropyl cellulose. As a rule, the hydroxyethyl groups constitute at least 30% of the total number of hydroxyalkyl groups, and the

number of ethyl substituents usually constitutes at least 10% of the total number of alkyl substituents. Examples of such cellulose ethers are ethylhydroxyethyl cellulose with DS_{ethyl} = 0.8-1.3 and $MS_{hydroxyethyl}$ = 1.9-2.9 and methylethylhydroxyethyl cellulose with DS_{methyl} = 1.0-2.5; DS_{ethyl} = 0.1-0.6 and $MS_{hydroxyethyl}$ = 0.1-0.8. The amount of alkylhydroxyalkyl cellulose usually is from 0.05 to 3, preferably from 0.2 to 1.5% by weight of the composition. The cellulose ethers can be produced in conventional manner by reacting mercerised cellulose with ethylene oxide and/or propylene oxide and methylchloride, ethylchloride and/or propylchloride.

[0009] The water-based compositions according to the invention suitably contain a binder in an amount 2-70, preferably 5-30% by weight. The binder may consist both of water-soluble binders and of binders in the form of water dispersions or latex. Examples of suitable binders are copolymerisates of ethylenically unsaturated carboxylic acids, starch, proteins, casein and carboxymethyl cellulose. Examples of suitable copolymerisates are those made up of monomers from the group of esters of acrylic acid and methacrylic acid, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, C_3-C_5 ethylenically unsaturated monocarboxylic acids, ethylenically unsaturated dicarboxylic acids and their semi-esters, vinylchloride, ethylenically unsaturated hydrocarbons, vinyl ester, vinyl sulphonic acid and esters of unsaturated carboxylic acids which are derived from multivalent alcohols. When the compositions are to be used for surface sizing of cellulose-based two-dimensional products, they also contain 5-65% by weight size, based on the dry solids content of the composition. Examples of suitable sizes are different types of colophonium, sulphate resin, protein complex, polyethylene wax dispersions, paraffin copolymers, melamine-formaldehyde resins etc.

[0010] The compositions may also contain pigments, which may consist of naturally derived inorganic pigments as well as synthetically produced pigments. Examples of pigments are kaolin, calcium carbonate, talc, titanium dioxide, satin white, hydratised aluminium, sodium silicoaluminate and plastic pigments and a large number of special pigments, such as barium sulphate and zinc oxide. In a pigment coating slip composition, the content of pigments usually is 5-65% by weight and constitutes 4 to 20 times the amount of binder.

[0011] A typical coating slip composition according to the invention is composed as follows, based on its dry solids content.

0.07-5, preferably 0.3-2% by weight of the alkylhydroxyalkyl cellulose as defined,
5-15, preferably 7-13% by weight of a latex,
60-94, preferably 70-90% by weight of the pigment,
0-10, preferably 0-7% by weight of a secondary binder,
0-3, preferably 0.1-2% by weight of a dispersing agent,
0-5, preferably 0-2% by weight of a protective colloid,
0-4, preferably 0-2% by weight of other additives, such as fluorescent whitening agents, bactericides, antifoaming agents and lubricants,
the dry solids content being from 20 to 70% by weight. The Brookfield viscosity of the coating slip composition normally is from 100 to 2,500 mPa·s at 100 rpm and 20°C. The viscosity of coating slip compositions having a dry solids content from 55 to 70% by weight is from 600 to 2500 mPa·s. An aqueous coating slip composition according to the invention can be produced by dispersing a pigment in water, optionally with the aid of a dispersing agent. The resulting slip can then be supplied with water-soluble binders included in the composition, alkylhydroxyalkyl cellulose and other additives and, finally, optional binder dispersions such as latex.

[0012] A method for producing a cellulose-based product coated with a composition according to the invention is characterised by

a) applying a composition according to the invention at a temperature below the cloud point of the alkylhydroxyalkyl cellulose to the cellulose-based product,
b) drying the two-dimensional cellulose product coated with the composition during heating, and
c) if desired, calendering said cellulose product.

The application of the composition takes place in a manner known per se, for instance by air knife coating, roll coating or blade coating. Usually, at least 90% of the drying takes place at a temperature range which to at least 60%, preferably completely, falls below the cloud temperature of the alkylhydroxyalkyl cellulose. Depending on the season and the geographic position, the temperature of the composition in application usually is in the range of 5-30, preferably 10-25°C.

[0013] The invention also concerns the use of a water-soluble nonionic alkylhydroxyalkyl cellulose as thickening agent as described in claim 1.

[0014] The invention is further illustrated by the following examples.

Example 1

[0015] A number of aqueous coating slip compositions with a dry solids content of 60% by weight and intended for

coating of paper were produced, based on the following recipe.

100 parts by weight	kaolin
10 parts by weight	styrene-butadiene latex
0.11 parts by weight	sodium acrylate
0.6-1.1 parts by weight	cellulose ether (the amount adjusted to give the composition a viscosity according to Brookfield 100 of about 1100 mPa·s)
balance	water to a dry solids content of 60% by weight.

[0016] The following cellulose ethers were used. All viscosities concern the viscosity in a 2% aqueous solution at 20°C.

Designation	Cellulose ether
A	Ethylhydroxyethyl cellulose which had been hydrophobically modified with nonyl phenyl groups, cloud point 52°C, viscosity 7,500 mPa·s
B	Cellulose ether according to A, whose chain had been shortened, cloud point 57°C, viscosity 460 mPa·s
C	Carboxymethyl cellulose, viscosity 10 mPa·s, (FINNFIX 10)
D	Hydroxyethyl cellulose, viscosity 8,000 mPa·s
E	Hydroxyethyl cellulose, viscosity 400 mPa·s
I	Methylethylhydroxyethyl cellulose, cloud point 65°C, viscosity 1,230 mPa·s
II	Ethylhydroxyethyl cellulose, cloud point 65°C, viscosity 300 mPa·s
III	Ethylhydroxyethyl cellulose, cloud point 69°C, viscosity 5,000 mPa·s
IV	Ethylhydroxyethyl cellulose, cloud point 69°C, viscosity 10,000 mPa·s
V	Ethylhydroxyethyl cellulose, cloud point 69°C, viscosity 80,000 mPa·s
VI	Methylhydroxypropyl cellulose, cloud point 57°C, viscosity 400 mPa·s

[0017] The various compositions were heated and their viscosities were measured. The following results were obtained.

Test	Ether	Bohlin CS-viscosity 4 s^{-1}, mPa·s			
		30°C	40°C	50°C	60°C
A	A	4460	4337	4871	4093
B	B	2748	3199	3833	3136
C	C	4667	4744	4908	5124
D	D	3830	3795	3779	3639
E	E	5804	5692	5412	4800
1	I	3621	4531	6094	5903
2	II	4572	6250	7855	7047
3	III	4186	5045	7398	7368
4	IV	4702	5390	6888	6190
5	V	5480	6110	6550	6750
6	VI	3860	4290	4920	4820

[0018] As appears from the results, the viscosity of the coating slip compositions according to the invention containing ethers I, II, III, IV, V and VI, after application, increased as the temperature was increased, whereas the coating slip compositions produced according to prior-art technique presented merely insignificant viscosity increases or even considerable viscosity decreases.

Example 2

[0019] A number of coating slip compositions having a dry solids content of 65% by weight, intended for the coating of paper, were produced based on the following recipe.

100 parts by weight	calcium carbonate
10 parts by weight	styrene-butadiene latex
0.6-1.1 parts by weight	cellulose ether (the amount adjusted to give a viscosity according to Brookfield 100 of about 1100 mPa·s)
balance	water

[0020] The type of cellulose ether appears from the following Table. The various compositions were heated and their viscosity was measured. The following results were obtained.

		Bohlin CS-viscosity 4 s^{-1}, mPa·s			
Test	Ether	30°C	40°C	50°C	60°C
F	A	3449	3389	3865	4919
G	C	3030	3011	3053	3220
H	E	3101	2891	2802	2714
6	I	3254	3339	3730	5630
7	II	2572	2903	4222	7224

[0021] As appears from the results, the compositions according to the invention had a better development of the viscosity when increasing the temperature than that of the comparison compositions.

Example 3

[0022] Three different coating slip compositions having a dry solids content of 65% by weight and a viscosity (Brookfield 100) of about 1,500 mPa·s were produced. They were composed as follows.

Ingredient	Formulation, parts by weight		
	1	2	3
Calcium carbonate	80	80	80
Kaolin	20	20	20
Latex, styrene-butadiene	10	10	10
Cellulose ether, type A	0.4	-	-
Cellulose ether, type C	-	0.65	-
Cellulose ether, type I	-	-	0.45
Water	balance	balance	balance

[0023] A composition in an amount of 24 g was weighed in thin-walled aluminium dishes and were levelled such that the surfaces, through which evaporation of water could take place, were of the same size. The various samples were then dried in a heating cabinet at 105°C and the change in weight was measured every 15th minute. The evaporation of water at the time 0 was determined as the average evaporation of water during the first 15 min of heating of the composition from 25°C to the final temperature 105°C. The following results were obtained.

Formulation	Drying rate, g H_2O/min, time			
	0	15	30	60
1	0.033	0.045	0.040	0.41
2	0.031	0.038	0.033	0.033
3	0.034	0.044	0.043	0.42

[0024] From the results appears that the composition according to the invention, which have a higher viscosity than the comparison compositions at higher temperatures, nevertheless have the same evaporation of water or even better.

Example 4

[0025] Two coating slip compositions having a dry solids content of 65% by weight were produced, having the following composition.

	Formulation, parts by weight	
	1	2
Calcium carbonate	100	100
Sodium polyacrylate	0.025	0.025
Cellulose ether C	0.4	-
Cellulose ether II	-	0.4
Styrene-butadiene latex	10	10

[0026] The viscosities of the coating slip compositions were measured at 50°C, 53°C, 56°C, 59°C and 62°C according to Bohlin CS 25 s^{-1}. The following results were obtained.

Temperature, °C	Viscosity, mPa·s, formulation	
	1	2
50	380	1 250
53	390	1 630
56	400	2 070
59	410	2 330
62	420	2 290

[0027] From the results appears that the viscosity increase at the elevated temperatures was essentially higher for the coating slip composition according to the invention than for the comparison composition.

Claims

1. Use of a water-soluble nonionic alkylhydroxyalkyl cellulose, which contains alkyl groups having 1-3 carbon atoms and hydroxyalkyl groups having 2-3 carbon atoms, but which is free from hydrophobically modified hydrocarbon groups having at least 4 carbon atoms, the cellulose ether having a cloud temperature or cloud point in the range from 35 to 80°C, as thickening agent in an aqueous composition containing a binder, for coating a cellulose-based two-dimensional product.

2. Use as claimed in claim 1, wherein the cellulose ether consists of an ethylhydroxyethyl cellulose.

3. Use as claimed in claim 1, wherein the cellulose ether consists of a methylethylhydroxyethyl cellulose.

4. Use as claimed in claim 1, 2 or 3, wherein the cellulose ether has a cloud point in the range from 45 to 70°C, and a viscosity of 10-10,000 mPa·s in a 2% aqueous solution at 20°C.

5. An aqueous composition containing a binder for coating a cellulose-based two-dimensional product **characterised in that** it contains a water-soluble nonionic alkylhydroxyalkyl cellulose, which contains alkyl groups having 1-3 carbon atoms and hydroxyalkyl groups having 2-3 carbon atoms, but which is free from hydrophobically modified hydrocarbon groups having at least 4 carbon atoms, the alkylhydroxyalkyl cellulose having a cloud point in the range from 35 to 80°C.

6. The composition as claimed in claim 5 for application of a layer of a coating slip, **characterised in that** it contains

0.05-3% by weight of the water-soluble nonionic alkyl hydroxyalkyl cellulose,
5-30% by weight of the binder, and
5-65% by weight of a pigment,
the composition having a Brookfield viscosity from 100 to 2,500 mPa·s and a dry solids content from 20 to 70% by weight.

7. The composition as claimed in claim 6, **characterised in that** it contains, based on the dry solids content, the following ingredients
0.07-5% by weight of the water-soluble nonionic alkylhydroxyalkyl cellulose,
7-13% by weight of a latex,
0-7% by weight of a secondary binder,
0.1-2% by weight of a dispersing agent,
0-2% by weight of a protective colloid, and
70-90% by weight of the pigment.

8. The composition as claimed in claim 7, **characterised in that** it has a dry solid content of 55-70% by weight, and that the latex consists at least partially of a styrene-butadiene latex or an acrylate latex, and that the pigment consists at least partially of calcium carbonate or kaolin.

9. The composition as claimed any one of claims 5-8, **characterised in that** the alkylhydroxyalkyl cellulose is a methylethylhydroxyethyl cellulose or an ethylhydroxyethyl cellulose having a cloud point in the range from 45 to 70°C and a viscosity of 10-10,000 mPa·s measured in a 2% solution at a temperature of 20°C.

10. A method for producing a coated cellulose-based two-dimensional product, **characterised in that**

a) an aqueous composition according to any one of claims 5-9 is applied to the cellulose-based two-dimensional product at a temperature below the cloud temperature of the alkylhydroxyalkyl cellulose, and
b) the cellulose-based product coated with the composition is dried during heating, and
c) if desired, said product is calendered.

Patentansprüche

1. Verwendung einer wasserlöslichen nicht-ionischen Alkylhydroxyalkylcellulose, welche Alkylgruppen mit 1 bis 3 Kohlenstoffatomen und Hydroxyalkylgruppen mit 2 bis 3 Kohlenstoffatomen enthält, aber frei von hydrophob modifizierten Kohlenwasserstoffgruppen mit mindestens 4 Kohlenstoffatomen ist, wobei der Celluloseether eine Trübungstemperatur oder einen Trübungspunkt im Bereich von 35 bis 80°C aufweist, als Verdickungsmittel in einer wässrigen Zusammensetzung, die ein Bindemittel enthält, zum Beschichten eines zweidimensionalen Produkts auf Cellulosebasis.

2. Verwendung wie in Anspruch 1 beansprucht, worin der Celluloseether aus einer Ethylhydroxyethylcellulose besteht.

3. Verwendung wie in Anspruch 1 beansprucht, worin der Celluloseether aus einer Methylethylhydroxyethylcellulose besteht.

4. Verwendung wie in Anspruch 1, 2 oder 3 beansprucht, worin der Celluloseether einen Trübungspunkt im Bereich von 45 bis 70°C und eine Viskosität von 10 bis 10.000 mPa·s in einer 2% wässrigen Lösung bei 20°C aufweist.

5. Wässrige Zusammensetzung enthaltend ein Bindemittel zum Beschichten eines zweidimensionalen Produkts auf Cellulosebasis, **dadurch gekennzeichnet, dass** sie eine wasserlösliche nicht-ionische Alkylhydroxyalkylcellulose enthält, die Alkylgruppen mit 1 bis 3 Kohlenstoffatomen und Hydroxyalkylgruppen mit 2 bis 3 Kohlenstoffatomen enthält, aber frei von hydrophob modifizierten Kohlenwasserstoffgruppen mit mindestens 4 Kohlenstoffatomen ist, wobei die Alkylhydroxyalkylcellulose einen Trübungspunkt im Bereich von 35 bis 80°C aufweist.

6. Zusammensetzung wie in Anspruch 5 beansprucht zum Auftragen einer Schicht von einer Streichmasse, **dadurch gekennzeichnet, dass** sie enthält
0,05 bis 3 Gew.-% der wasserlöslichen nicht-ionischen Alkylhydroxyalkylcellulose,

5 bis 30 Gew.-% des Bindemittels und
5 bis 65 Gew.-% eines Pigments,
wobei die Zusammensetzung eine Brookfield-Viskosität von 100 bis 2.500 mPa·s und einen Trockengehaltanteil von 20 bis 70 Gew.-% aufweist.

7. Zusammensetzung wie in Anspruch 6 beansprucht, **dadurch gekennzeichnet, dass** sie auf Basis des Trockengehaltanteils die folgenden Bestandteile enthält:
0,07 bis 5 Gew.-% der wasserlöslichen nicht-ionischen Alkylhydroxyalkylcellulose,
7 bis 13 Gew.-% eines Latex,
0 bis 7 Gew.-% eines sekundären Bindemittels,
0,1 bis 2 Gew.-% eines Dispergiermittels,
0 bis 2 Gew.-% eines Schutzkolloids und
70 bis 90 Gew.-% des Pigments.

8. Zusammensetzung wie in Anspruch 7 beansprucht, **dadurch gekennzeichnet, dass** sie einen Trockengehaltanteil von 55 bis 70 Gew.-% aufweist und der Latex mindestens teilweise aus einem Styrol-Butadien-Latex oder einem Acrylat-Latex besteht und das Pigment zumindest teilweise aus Calciumcarbonat oder Kaolin besteht.

9. Zusammensetzung wie in irgendeinem der Ansprüche 5 bis 8 beansprucht, **dadurch gekennzeichnet, dass** die Alkylhydroxyalkylcellulose eine Methylethylhydroxyethylcellulose oder eine Ethylhydroxyethylcellulose mit einem Trübungspunkt im Bereich von 45 bis 70°C und einer Viskosität von 10 bis 10.000 mPa·s, gemessen in einer 2%igen Lösung bei einer Temperatur von 20°C, ist.

10. Verfahren zur Herstellung eines beschichteten zweidimensionalen Produkts auf Cellulosebasis, **dadurch gekennzeichnet, dass**

a) eine wässrige Zusammensetzung nach irgendeinem der Ansprüche 5 bis 9 auf das zweidimensionale Produkt auf Cellulosebasis bei einer Temperatur unterhalb des Trübungspunkts der Alkylhydroxylalkylcellulose aufgetragen wird und
b) das mit der Zusammensetzung beschichtete Produkt auf Cellulosebasis während des Erwärmens getrocknet wird und
c) falls gewünscht, das Produkt kalandriert wird.

Revendications

1. Utilisation d'une alkylhydroxyalkylcellulose non ionique hydrosoluble, qui contient des groupes alkyle comportant 1 à 3 atomes de carbone et des groupes hydroxyalkyle comportant 2 à 3 atomes de carbone, mais qui est exempte de groupes hydrocarbure modifiés de façon hydrophobe comportant au moins quatre atomes de carbone, l'éther de cellulose présentant une température de trouble ou un point de trouble dans la gamme allant de 35 à 80 °C, en tant qu'agent épaississant dans une composition aqueuse contenant un liant, afin d'enduire un produit bidimensionnel à base de cellulose.

2. Utilisation selon la revendication 1, dans laquelle l'éther de cellulose se compose dune éthylhydroxyéthylcellulose.

3. Utilisation selon la revendication 1, dans laquelle l'éther de cellulose se compose dune méthyléthylhydroxyéthylcellulose.

4. Utilisation selon la revendication 1, 2 ou 3, dans laquelle l'éther de cellulose présente un point de trouble dans la gamme allant de 45 à 70 °C, et une viscosité comprise de 10 à 10 000 mPa.s dans une solution aqueuse à 2 % à 20 °C.

5. Composition aqueuse contenant un liant destinée à enduire un produit bidimensionnel à base de cellulose, **caractérisée en ce qu'**elle contient une alkylhydroxyalkylcellulose non ionique hydrosoluble, qui contient des groupes alkyle comportant 1 à 3 atomes de carbone et des groupes hydroxyalkyle comportant 2 à 3 atomes de carbone, mais qui est exempte de groupes hydrocarbure modifiés de façon hydrophobe comportant au moins quatre atomes de carbone, l'alkylhydroxyalkyl-cellulose présentant un point de trouble dans la gamme allant de 35 à 80 °C.

6. Composition selon la revendication 5 pour appliquer une couche d'une masse de couchage, **caractérisée en ce qu'**elle contient :

0,05 à 3 % en poids de l'alkylhydroxyalkylcellulose non ionique hydrosoluble,
5 à 30 % en poids du liant, et
5 à 65 % en poids d'un pigment,

la composition présentant une viscosité Brookfield comprise de 100 à 2 500 mPa.s et une teneur en solides secs comprise variant de 20 à 70 % en poids.

7. Composition selon la revendication 6, **caractérisée en ce qu'**elle contient, sur la base de la teneur en solides secs, les ingrédients suivants

0,07 à 5% en poids de l'alkylhydroxyalkylcellulose non ionique hydrosoluble,
7 à 13 % en poids d'un latex,
0 à 7 % en poids d'un liant secondaire,
0,1 à 2 % en poids d'un agent dispersant,
0 à 2 % en poids d'un colloïde protecteur, et
70 à 90 % en poids du pigment.

8. Composition selon la revendication 7, **caractérisée en ce qu'**elle présente une teneur en solides secs de 55 à 70 % en poids, et **en ce que** le latex se compose au moins partiellement d'un latex de styrène-butadiène ou d'un latex acrylate, et **en ce que** le pigment se compose au moins partiellement de carbonate de calcium ou de kaolin.

9. Composition selon l'une quelconque des revendications 5 à 8, **caractérisée en ce que** l'alkylhydroxyalkylcellulose est une méthyléthylhydroxyéthylcellulose ou une éthylhydroxyéthylcellulose présentant un point de trouble dans la gamme allant de 45 à 70 °C et une viscosité de 10 à 10 000 mPa.s, mesurée dans une solution à 2 % à une température de 20 °C.

10. Procédé de production d'un produit bidimensionnel enduit à base de cellulose, **caractérisé en ce que**

a) une composition aqueuse telle que définie selon l'une quelconque des revendications 5 à 9 est appliquée sur le produit bidimensionnel à base de cellulose à une température inférieure à la température de trouble de l'alkylhydroxyalkylcellulose, et
b) le produit à base de cellulose enduit de la composition est séché lors du chauffage, et
c) si désiré, ledit produit est calandré.